RapidTrace 1200 User Guide

Issue 1.0

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Section 1 - Receiving the RapidTrace 1200

Upon delivery of the RapidTrace 1200, ensure the contents are consistent with the packing list, notify your supplier of any missing items.

If the equipment appears damaged, notify your carrier and supplier immediately, giving a detailed description of any damage, save the damaged packaging to substantiate your claim.

THE RapidTrace 1200 IS SUPPLIED WITH 0.5-METER CONNECTION LEAD, SOFT CASE, BATTERIES, USB CONNECTION LEAD, TraceXtra SOFTWARE CD, USER MANUAL CD AND QUICK START GUIDE

1.1 Safety notices

Warning

- This instrument meets the safety requirements of IEC61010-1: 1995
- TheRapidTrace 1200 is designed for use on de-energized circuits only.
- Connection to line voltages will damage the instrument and could be hazardous to the operator
- This instrument is protected against connection to telecom network voltages according to EN61326-1.

International Electrical Symbols

This symbol signifies that the instrument is protected by double or reinforced insulation. Use only specified replacement parts when servicing the instrument.

This symbol on the instrument indicates a WARNING, and that the operator must refer to the user manual for instructions before operating the instrument. In this manual, the symbol preceding instructions indicates that if the instructions are not followed, bodily injury, installation/sample and product damage may result.

Risk of electric shock. The voltage of the parts marked with this symbol may be dangerous.

1.2 Standards

The RapidTrace 1200 has been manufactured in accordance with and meets the requirements of the following international standards:

SAFETY	IEC 61010-1 EN 60950
EMC	BS/EN 61326-1
Water/Dust Proof to IP54	

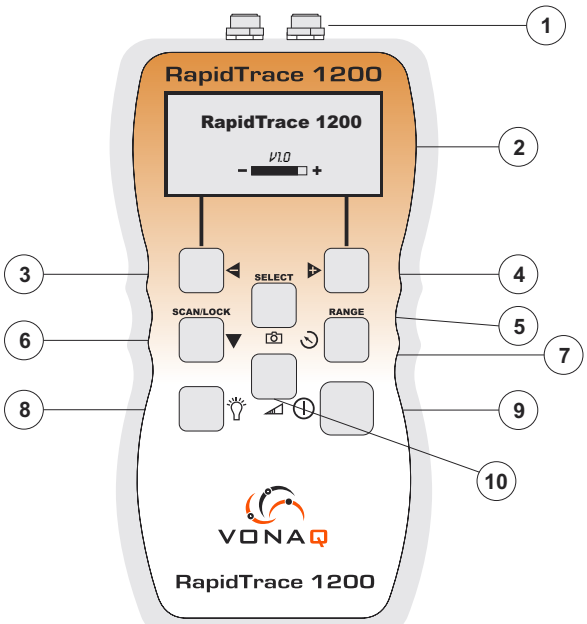
Section 2 - Introducing the RapidTrace 1200

The RapidTrace 1200 is a hand held Time Domain Reflectometer weighing only 350 grams with a 6km range and the capacity to store 50 traces with time, date, Vp value, impedance, cursor position and range, saved data may then be downloaded to PC via the USB link using Trac Xtra PC software provided. Historical data may be uploaded to the RapidTrace 1200 for comparison with current measurements. With a 3 nano second pulse rise time giving a dead zone of only 0.5 mtrs near end and cable faults can be clearly identified.

Using pre determined gain and pulse width and with only 5 control buttons, all major operating and setting parameters can be easily accessed. A 6km cable run can be scanned in seconds allowing the operator a view of this cable run, yet arriving quickly to the fault.

By using the scan lock facility, the cable can be continuously scanned for the location of intermittent faults or the trace held for closer examination. To enable the RapidTrace 1200 to test all metallic cables, 4 user selectable impedance settings are provided, 25, 50, 75 and 100 ohms with Vp settings of 1-99% or the equivalent in feet or meters per micro second. Faulty cables may be traced using the warble tone feature, an oscillating tone is injected into the power or transmission line and by using a commercially available tone tracing probe, the suspect line can be identified. The RapidTrace 1200 is CE approved and is housed in a rugged ABS enclosure rated to IP54 and is suitable for outside use.

2.1 RapidTrace 1200 Features



1 2x4mm safety connectors
2 128 x 64 graphics display
3 Cursor left/decrease setting
4 Cursor right/increase setting
5 Store trace/select
6 Scan/lock Cursor down
7 Range/Return
8 Back Light On/Off
9 Power on/off
10 Gain Control

2.2 Specifications

Ranges Meters	7, 15, 30, 60, 120, 250, 500, 1km, 2km, 3km, 6km
Feet	23, 49, 98, 197, 394, 820, 1640, 3280, 6560, 9850, 19000
Range Selection	Manual range control
Accuracy	1% of selected range*
Resolution	Approx 1% of range
Sensitivity	Min 3 pixel return at 4km on 0.6mm Ø, PE, TP
Velocity Factor	Adjustable from 1% to 99% or Feet Meters / Micro Second
Output Pulse	5 volts peak to peak. Into open circuit
Output Impedance	Selectable 25, 50, 75 & 100 ohms
Output Pulse Width	3 ns to 3 ms, Automatic with range
Scan Rate	2 scans / second or scan held
Memory Caoacity	50 Traces
Tone Generator	810 – 1100Hz
Battery Life	60 hours continuous scanning
Power Supply	6 volts 4 x 1.5 AA Alkaline cells
Power Down	Selectable 1, 2, 3 minutes or disabled
Back Lit Display	128 x 64 pixel
Voltage Protection	250 volts AC
Operating Temp	-10º / 50ºC
Storage Temp	-20º / 70ºC
Dimensions	165 x 90 x 37 (6.5 x 3.5 x 1.5 ins)
Weight	350 gms (12oz)
Safety	IEC 61010-1 EN 60950
EMC	BS/EN 61326-1
Water/Dust Proof	IP54

* Measurement accuracy of <+/- 1% assumes the instrument setting for velocity of propergation (Vp) of the cable under test to be accurately set, homogeneity of the Vp along the cable length, and accurate cursor positioning.

2.3 Accuracy

The RapidTrace 1200 is able to measure distances to faults and cable lengths to an accuracy of +/- 1%.

This measurement accuracy is based on the correct value of Vp being used for the cable under test, and homogeneity of the Vp along the cable length and accurate positioning of the cursor (see section 4.1).

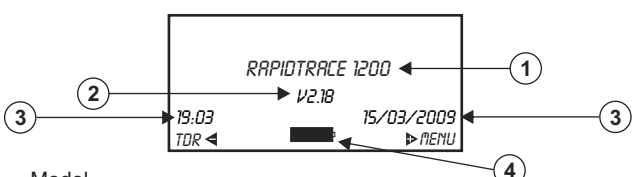
If the Vp is set incorrectly by the operator, or the Vp varies along the length of the cable, then additional errors will be incurred and the measurement accuracy will be affected.

Note:- The Vp is less well defined with unshielded multicore cable, including power cable, and is lower when a cable is tightly wound on a drum than when installed.

Section 3 - First Operation

3.1 Preparing the RapidTrace 1200 for use

Press button ⏻ to power the tester, the following screen will be displayed:



1 Model
2 Software version programmed into tester
3 Time & Date
4 Battery condition indicator (all black battery, fully charged, as charge decreases symbol changes to white) Battery condition indicator is permanently displayed.

Prior to use the following parameters will need to be set - Refer to section 3.2 to select menu.

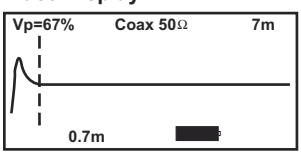
1	Select unit of measure	section 3.3
2	Set contrast	section 3.4
3	Set Auto-Shutdown	section 3.5
4	Clock Settings	section 3.6

3.2 Menu and Screen Displays

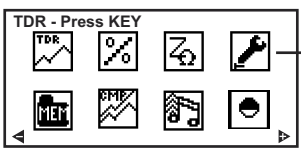
Level 1. Start up screen

To access level 2 main menu press key ▶. To access trace display press key ◀.

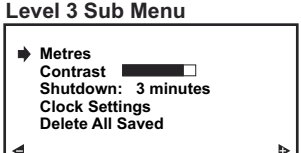
Trace Display



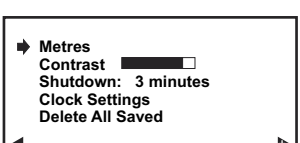
Level 2 Main Menu



Level 3 Sub Menu



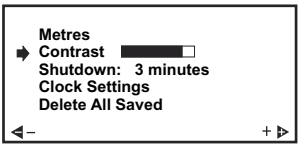
3.3 Set Unit of Measure (Level 3 Sub Menu)



Press ▼ to move ➡ to unit of measure (feet or meters). Press ◀ or ▶ to scroll between feet and meters. Press ↻ button to exit, selected value will be automatically stored.

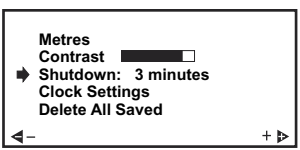
Note:- When unit of measure has been selected, this will automatically change the V/2 figure, which will also be displayed in the selected unit of measure i.e FEET or METERS.

3.4 Set Contrast (Level 3 Sub Menu)



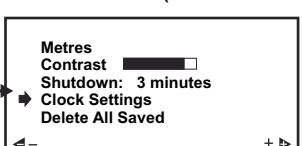
Press ▼ to move ➡ to contrast. Press ◀ to decrease contrast, press ▶ to increase contrast.
Press TDR button to exit.
Contrast may also be set from level 2 menu select icon [◓] Press ⟲ to return to menu settings will be automatically saved.

3.5 Set Auto Shutdown (Level 3 Sub Menu)

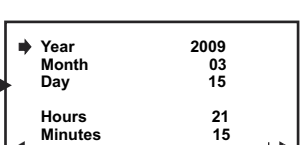


To preserve battery life, the RapidTrace 1200 is fitted with an auto shutdown feature. Shutdown time is selectable between disabled 1 minute, 2 minutes and 3 minutes.
To change settings press ▼ to move ➡ to shutdown, use ◀ or ▶ to select setting. Press ⟲ to return to menu.

3.6 Set Clock (Level 3 Sub Menu)



Press ▼ to move ➡ to Clock Settings. Press Select.

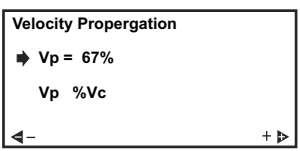


Press ▼ to move ➡ to selected position. Press ◀ and ▶ keys to decrease or increase. When the required setting is displayed, press ▼ to move ➡ to next position. When all settings are completed press ⟲ to return to sub menu, settings will automatically be stored.

3.7 Set Velocity of Propergation (Vp) (Level 3 Sub Menu)

Velocity of propergation (Vp) may be set as % or speed in micro seconds (ms). The unit of measure, the speed is displayed in (feet or meters), will be determined by the setting selected in section 3.4

From Level 2 Menu using ◀ or ▶ move to icon Press Select. The following sub-menu will be displayed.



Press ▼ to move ➡ to displayed unit (V/2 or Vp%) of measure. Press ◀ to scross between units. When required unit is displayed press to exit or press ▼ to move ➡ to displayed speed. Press ◀ or ▶ to decrease or increase value. Press to Escape, values will automatically be stored.

3.8 Set Cable Impedance

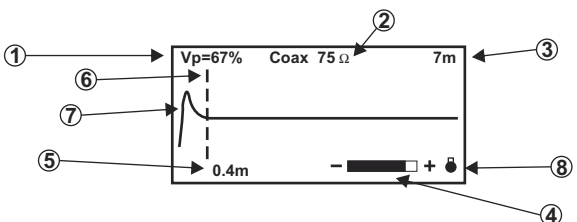
From Level 2 Main Menu press ◀ or ▶ move to icon . Press Select. Press ◀ or ▶ to select required value. Press to Escape. Values will be automatically stored.

3.9 Backlight

The LCD display is fitted with an electro-luminescent backlight to enable easy viewing under a variety of different lighting conditions. The backlight is switched on and off with the ☼ key.

Section 4 - Using the RapidTrace 1200

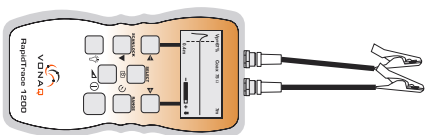
Upon completion of the set up procedures in section 3, press key ◀ and the following test screen will be displayed



1. Vp Setting
2. Impedance setting (Z)
3. Range scale 7 mtrs
4. Battery condition indicator
5. Distance of cursor
6. Cursor
7. Output pulse
8. Scan mode icon (indicating scan mode selected)

Attach the connection leads to the two 4mm saftey sockets located at the top of the unit

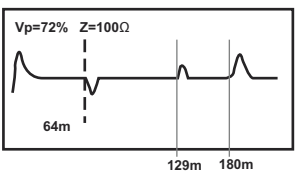
1. Ensure that no power supply or equipment is attached to the cable to be tested
2. Ensure that the far end of the cable under test is open or shorted (not fitted with a resistive termination)
3. Attach the RapidTrace 1200 to one end of the cable to be tested



Coaxial Cable: Connect the red clip to the centre wire and the black clip to the shield/screen.
Shielded Cable: Connect the red clip to a wire adjacent to the shield and the black clip to the shield.
Twisted Pair: Separate out one pair and connect the red and black clips to the two wires of the pair.
Multicore Cable: Connect the clips to any two wires.

4.1 Testing a cable

Having followed the set up procedures in the preceding sections, a typical display showing impedance anomalies is shown below. Further examples are shown in section 4.6.



The vertical cursor line is moved left or right along the line of the trace by pressing ◀ and ▶ buttons to determine the distance to the event. Position the cursor at the beginning of the event and read off the distance at the bottom left corner.

On the fault display shown above a low impedance fault occurs at 64 meters shown by a negative spike, and a high impedance at 129 meters. The open end of the cable is shown as a large positive spike, this is used to determine the end of the cable run and the overall length of the cable being 180 meters.

4.2 Selecting Range Scales

The RapidTrace 1200 has 11 range scales covering the range of 0.5 to 6,000 meters.
To select a range scale, or scan the cable run, press and hold down the Range key and press ◀ to decrease range, press ▶ to increase range.

4.3 Single shot and Continuous Scanning Modes

When the RapidTrace 1200 is first switched on, it is set to “Single Shot” mode.
In this mode the RapidTrace 1200 only fires a pulse into the cable under test when either the ◀ and ▶ buttons or ▼ button is pressed.

Single Shot Mode: Saves on battery life and also enables the RapidTrace 1200 to be disconnected from the cable while still leaving the fault display on the screen

To enter **"Continuous Scanning"** mode press down and hold the ▼ button.

The icon will appear at the bottom right of the display, when continuous scanning mode is activated.

Continuous Scanning Mode: fires pulses into the cable under test. In this mode the RapidTrace 1200 is able to more easily identify intermittent cable faults.

4.4 Tone Generator

The RapidTrace 1200 may also be used as a tone generator to trace and identify cables and wires. The user will need a conventional inductive tone probe within the range 810 Hz to 1110Hz.

To select tone generator (Level 2)

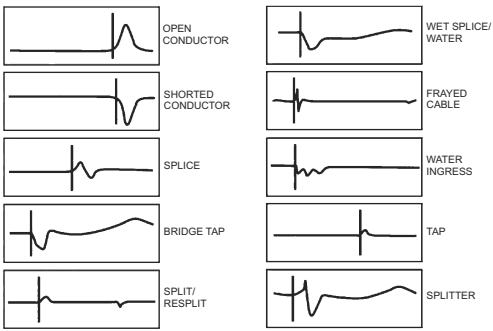
From level 2 main menu using ◀ or ▶ to move to icon press select. The tester is now in tone generator mode. Upon completion of testing press to return to menu.

When tone has been selected, connect test lead to cable pair to be traced and using tone probe which will emit a tone, the volume will increase the nearer the probe is to the cable / being traced.

Note:- The auto off function is disabled in tone generator mode so that the tone can be injected into a cable for extended periods while tracing takes place.

4.5 Typical Fault Displays

The following diagrams show typical fault traces to assist you in the identification of faults using the RapidTrace 1200:



4.6 Typical Cable V.P and Impedance Values

Type	Vp	Z	Type	Vp	Z
Cat5 STP	72	100	T/Pair Jelly PE	64	100
Cat5 UTP	70	100	T/Pair PE	67	100
Coax Air	98	50/75	T/Pair PTFE	71	100
Coax Air Space	94	50/75	T/Pair PVC	58	100
Coax Foam PE	82	50/75	T/Pair Paper 72nF	88	100
Coax Solid PE	67	50/75	T/Pair Paper 83nF	72	100

4.7 How to determine Vp settings

If the TDR RapidTrace 1200 is to be used with a cable type for which the Vp is unknown, this must first be determined.

1. Take a sample of the cable at least 100m or 300ft long.
2. Measure the actual length of cable using a rule or tape measure, or some other reliable method.
3. Connect the TDR RapidTrace 1200 and adjust the Vp setting such that the tester gives a correct reading of the sample length.

4.8 Variable Gain Control

To operate user variable gain press and hold down gain control key and press ◀ and ▶ keys to increase or decrease gain.

Gain value selected is displayed in the bottom right hand corner of the display.

Section 5 - Memory Functions and Settings

5.1 Saving Traces

When required trace is displayed press trace will be automatically stored with time, date, vp, impedance (z), range and cursor position. The trace number that has been saved will be shown in the bottom right of the display.

5.2 Recall Trace from Memory

From menu, use keys ◀ and ▶ to scroll to MEM, press select, first saved trace will be displayed, press keys ◀ or ▶ to view saved traces. press ↺ to return to menu.

5.3 Trace Comparisons

from menu, use keys ◀ or ▶ to scroll to , press select, first saved trace will be displayed, press keys ◀ or ▶ to select required trace. press Select to start a new trace, the retrieved trace will remain on the display but will be shown as a dotted line. the trace from the cable under test will be displayed as a solid line

5.4 Delete Saved Traces from Memory

When using this function ensure traces that are to be saved have been downloaded to the PC. Once traces have been deleted they cannot be retrieved.

From menu, use keys ◀ or ▶ to scroll to , press Select, press ▼ to 'delete all saved'. Press select, to continue with deletion follow the instructions displayed

5.5 Download and Upload Function

For operating instructions on using this function refer to the Tracextra software manual. The software manual is published on this CD.
tracextra (for bi). the software manual is published on this cd.

Section 6 - Maintenance

6.1 Battery Replacement

Disconnect the instrument from any cable or network link

- Turn the instrument off
- Loosen the two black screws and remove the battery compartment cover
- Replace the batteries with 4 x 1.5 volt Alkaline batteries, observing the polarities
- Refit the battery compartment cover and refit the two screws

6.2 Cleaning

Disconnect the instrument from any source of electricity

- Turn the instrument off
- Use a soft cloth lightly dampened with soapy water, wipe over the instrument, rinse the cloth in clean water squeezing out any excess water, wipe over the instrument removing any soap residue, dry instrument with a dry cloth
- Do not splash water directly on the instrument
- Do not use alcohol, solvents or hydrocarbons

6.3 Storage

If the instrument is not to be used for a period of more than 60 days, it is recommended that the batteries are removed and stored separately (see 5.1)

Section 7 - Repair and Warranty

The instrument contains static sensitive devices and is not user serviceable. If an instrument fails, or its protection has been impaired, it should not be used but sent back for repair by suitably trained and qualified personnel.

New instruments are guaranteed against breakdown due to manufacturing or component defects for 36 months after the purchase date by the user.

Note:- Any unauthorized prior repair or adjustment to the instrument will automatically invalidate the warranty

7.1 Contacting Us

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